



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 5

77 WEST JACKSON BOULEVARD

CHICAGO, IL 60604-3590

OCT 28 2010

REPLY TO THE ATTENTION OF:

E-19J

Robert F. Tally, Jr., Division Administrator
Federal Highway Administration - Indiana Division
575 North Pennsylvania St., Room 254
Indianapolis, IN 46204

Michael B. Cline, Commissioner
Indiana Department of Transportation
100 North Senate Ave., Room N642
Indianapolis, Indiana 46204

RE: I-69 Evansville to Indianapolis, Tier 2 Draft Environmental Impact Statement (DEIS) for Section 4: Crane NSWC to Bloomington, Indiana. CEQ No. 20100281

Dear Mr. Tally and Mr. Cline:

The U.S. Environmental Protection Agency Region 5 (EPA) reviewed the Federal Highway Administration (FHWA)/Indiana Department of Transportation (INDOT) I-69 Tier 2 Section 4 Draft Environmental Impact Statement (DEIS), pursuant to Section 102(2)(C) of the National Environmental Policy Act (NEPA), and Section 309 of the Clean Air Act. The Section 4 Tier 2 DEIS is the fourth of six Tier 2 DEISs EPA reviewed for the 142-mile-long I-69 Indianapolis to Evansville Project. Section 4 extends approximately 22 miles from just east of US 231 to State Road 37 (SR 37).

The DEIS-identified Preferred Alternative is Alternative 2, comprised of subsection alignments 4A-2, 4B-1, 4C-2, 4D-1, Hybrid 4E-1/4E-2, 4F-3, 4G-2 and 4H-2, with three proposed interchanges (Option 1) at SR 45, Greene/Monroe County Line (with the South Connector Road Option) and SR 37. The Greene/Monroe County Line interchange with an approximately 1-mile long connector road to SR 45/SR 445 was introduced as a potential new interchange location for Section 4 after the Tier 1 FEIS/Record of Decision (ROD).

EPA rates the DEIS preferred alternative as "EC-2, Environmental Concerns-Insufficient Information." In order to fully assess environmental impacts, additional analysis regarding the vulnerability of water resources should be undertaken. In order to fully protect the environment, additional mitigation measures should be identified in the Final EIS (FEIS). An explanation of our rating system can be found in the enclosure entitled, "Summary of Rating Definitions and Follow-Up Actions." Our detailed

comments are also enclosed. Our detailed comments incorporate our reaction to INDOT's responses to our earlier comments regarding compensation mitigation as a result of the mitigation field visit. Our detailed comments also include EPA's technical review of the Section 4 Karst Report (unredacted version).

Protection of Water Resources in Karst and Other Challenging Environments

EPA concerns relate primarily to the project having the potential for direct and indirect adverse impacts to surface and groundwater quality and quantity in relation to streams/ponds/wetlands, drinking water supplies (wells and springs) and associated public health risks, particularly in karst areas and other challenging environments. All relevant measures to protect these resources should be incorporated into the project's final design, construction and operation. The DEIS identifies some measures that might be taken during final design and construction. However, the DEIS defers identification of specific design, construction and operation mitigation measures and best management practices (BMPs) for the preferred alternative until final design, after the Record of Decision (ROD).

We recommend that the FEIS explain INDOT's proposed project development and contracting process for Section 4 and provide a process timeline and approval authority for incorporation of project-specific design elements/features and BMPs required by INDOT for project construction and operation. We understand that decisions regarding the best approach to take during construction when encountering a karst feature will be made at that time specifically for each particular karst feature encountered. However, at the very least, we recommend the FEIS provide a list/matrix of appropriate design elements and BMPs for specific situations that are likely to be encountered during final project design, construction and operation and include cost estimates for each design feature and BMP. We suggest this list/matrix could serve as the starting point from which INDOT, the Karst MOU resource agencies, the designer and/or construction contractor may choose from to mitigate impact to karst features.

We commend FHWA and INDOT for convening a panel of local development experts to estimate how I-69 may affect growth in the project area. The geology in portions of the Section 4 project area presents challenges for providing effective wastewater treatment for homes and businesses. The document acknowledges the potential adverse impacts to water resources. However, the FEIS needs additional analysis and discussion to better identify those areas where surface and/or groundwater resources may be more vulnerable. This includes the areas identified as the project's anticipated induced growth areas. The DEIS considers various growth inducing and limiting factors in various portions of the document, generally in the narrative. A spatial analysis will help identify areas of greater vulnerability from single or overlapping factors from the natural and built/managed environments. A clear spatial presentation will enable all reviewers and decision-makers to know where these areas are in the communities. We describe the parameters of such a map in our detailed comments.

Streams

Stream impacts are the major aquatic issue for Section 4. Overall stream quality is understated in the DEIS. The amount and quality of stream relocation or permanent

loss from this project ranges between 17.6 and 21.4 miles, compensatory mitigation must be provided to offset this loss.

Compensation mitigation efforts identified in the DEIS have not advanced much from the Tier 1 documentation. However, we are aware that much work has been taking place since Tier 1. We recommend the FEIS reflect the full scope of the compensation mitigation efforts that have already taken place and include a discussion and up-to-date version of the compensation mitigation plan for Section 4.

Some of our enclosed project comments relate to the future Clean Water Act (CWA), Section 404 permitting process. We wish to raise questions or potential issues early, so that they can be better resolved. EPA's position is that the quantity and quality of federal jurisdictional stream resources proposed to be permanently lost in this Section 4 project will need formal compensatory mitigation in CWA Section 404 permitting, no matter what permitting tool is chosen by the Louisville District of the Corps of Engineers. Any of these streams which prove to be outside of current Federal jurisdiction should be mitigated under any applicable State jurisdiction and/or voluntarily under NEPA. We anticipate continued technical involvement and comments during the NEPA and 404 processes.

Air Quality

The DEIS correctly identifies Greene County is a maintenance area for the 8-hour ozone standard. The County is currently in attainment of the standard and is under an approved maintenance plan. The DEIS identifies that the conformity determination requirements for the I-69 project in Greene County will be determined after further agency consultation. The FEIS/ROD will include the regional and project level conformity demonstration updated as appropriate to reflect the proposed implementation timeline. The results of any conformity analysis will be discussed in the FEIS. Patricia Morris is the EPA Region 5 Air and Radiation Division (ARD) contact for this project and may be reached by calling 312/353-8656 or at morris.patricia@epa.gov.

EPA Class V Permits

The DEIS identifies that the project may need an EPA Class V injection well permit. In our detailed comments, we provide the clarifying language regarding EPA's Underground Injection Control (UIC) program and Class V permits under the Safe Drinking Water Act, and recommend it be incorporated into the FEIS. We also discuss the process for determining whether a Class V permit will be required. For additional information regarding EPA Class V permits and UIC program, contact Ross Micham, UIC Branch at 312/886-4237 or at micham.ross@epa.gov.

Summary of Overall Project Impacts

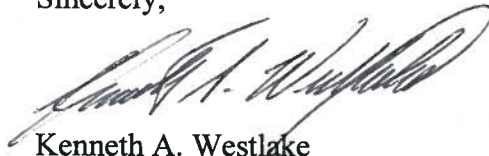
We request the Section 4 FEIS include the updated running tally of the impacts to resources of concern of the overall I-69 Indianapolis to Evansville project. In the NEPA documents for Sections 2 and 3 this tally was found in Appendix ZZ. The resources being tallied and tracked should now include the various karst feature types (cave openings, swallets, sinkholes, sinking streams, etc). The DEIS indicates that a precise tally of cumulative impacts is not readily attainable. EPA suggests that at least an

estimate of cumulative impacts is attainable and requests that they be included in the FEIS running tally of impacts.

We reiterate our request that the Section 4 FEIS and the future Tier 2 EISs for Sections 5 and 6 include a detailed explanation of the tracking system that INDOT is using to insure that the overall I-69 project's impacts are identified and all Tier 1 and Tier 2 NEPA mitigation measures as well as regulatory mitigation requirements are successfully implemented.

If you have any questions about EPA's comments, please contact Virginia Laszewski at 312-886-7501 or email her at laszewski.virginia@epa.gov. When the Section 4 FEIS is available, please send us 3 hard copies and 5 CDs, for our review.

Sincerely,



Kenneth A. Westlake
Chief, NEPA Implementation Section
Office of Enforcement and Compliance Assurance

Enclosures: 2

cc: U.S. Army Corps of Engineers – Louisville District, Attention: CELRL-OP-F,
P.O. Box 59, Louisville, KY 40401-0059 (Greg McKay)
U.S. Fish and Wildlife Service, Region 3, Bloomington Ecological Services
Office, 620 S. Walker Street, Bloomington, IN 47403-2121 (Scott Pruitt)
Indiana Department of Environmental Management, Office of Water Quality,
Section 401 Water Quality Certification Program, 100 N. Senate Avenue,
MC 65-40, Indianapolis, IN 46204-2251 (Randy Braun)
Indiana Department of Natural Resources, 402 W. Washington St., Rm W264,
Indianapolis, IN 46204 (Matt Buffington)

**EPA Comments Concerning the I-69 Evansville to Indianapolis,
Tier 2 Draft Environmental Impact Statement
Section 4 – Crane NSWC to Bloomington, Indiana
CEQ No. 20100281**

Our detailed comments incorporate our responses to INDOT's responses to EPA comments regarding compensation mitigation as a result of the mitigation field visit. The detailed comments also include EPA's technical review of the Section 4 Karst Report (unredacted version). EPA comments follow this order:

WATER RESOURCES

- Overview
- Interchanges and Indirect Impacts to Water Quality and Public Health
- Wetlands and Open Water Impacts
- Stream Impacts
 - o Perennial and Riffle-Poll Streams
 - o Intermittent and Ephemeral Streams
 - o All Streams
- Mitigation and Compensatory Mitigation

KARST RESOURCES

- Analysis of Karst Impacts as part of the Alternatives Consideration Process
- Potential Impacts to Unknown Subsurface Karst Features
- Potential Impacts on Drinking Water Quantity and Quality
- Variability in Flow Conditions as Part of the Pollutant Loading Analysis
- Karst Fauna Study Methodology
- Construction Blasting
- Identification of Mitigation Measures for Karst Areas

AIR QUALITY

- Air Conformity
- Mobile Source Air Toxics (MSAT)
- Greenhouse Gases/Climate Change
- Air Quality Mitigation During Construction

EPA CLASS V PERMITS

EPA Technical Adequacy Review of the I-69 Evansville to Indianapolis Tier 2 Studies – Survey of Karst Features Report, Section 4, US 231 to SR 37, Contains Confidential Information, dated June, 2010.

**SECTION 4 DEIS - DOCUMENT CLARITY – ERRATA: FIGURES/MAPS,
TABLES, DEFINITIONS**

WATER RESOURCES

Overview

Our concerns regard water quality, stream and wetland impacts and focus on: indirect impacts from an additional highway interchange, technical refinements when discussing wetlands and open water impacts, greater attention needed for the display and analysis and quality of stream impacts, effectively reducing temporary construction impacts, and providing the right kinds and amounts of compensatory mitigation for the unavoidable adverse impacts of the preferred alternative. Please note that where our following comments also pertain to INDOT's response to EPA's original field mitigation site visit comments, the specific original comment # is provided after the response in **red font**, e.g., **(Response #9)**.

Streams: Stream impacts are the major aquatic issue for Section 4 of the proposed I-69 highway. Overall stream quality is understated in the DEIS and needs more attention in the FEIS. Specific locations and structures to reduce stream impacts at specific stream reaches need to be clearly depicted in the FEIS. Special attention needs to be given to sedimentation control for construction impacts for this large, cross-country project in steep terrain. Best Management Practices (BMPs) uniquely suitable for this situation must be identified and used.

Compensatory Mitigation: In the DEIS, conceptual compensatory mitigation for wetland and stream impacts is similar to that developed in the Tier I FEIS. More work is ongoing and needs to be reflected in the FEIS. Wetland and forest mitigation requirements should be calculated in acres. Stream mitigation requirements should be calculated in linear feet, for restoration and/or enhancement involving *both* banks of the stream. Riparian buffers in specified minimum widths need to be used to protect stream stability and quality.

Clean Water Act (CWA) Section 404: Some of our project comments relate to the future CWA Section 404 permitting process. We wish to raise these questions early, so that they can be better resolved. We anticipate continued technical involvement and comments during the NEPA and 404 processes.

EPA's position is that the quantity and quality of stream resources proposed to be relocated or permanently lost in this project, 93,100-112,801 linear feet (about 17.6 to 21.4 miles), will need formal compensatory mitigation in CWA 404 permitting, no matter what permitting tool is chosen by the Louisville District of the Corps of Engineers. Any of these streams which prove to be outside of current Federal jurisdiction should be mitigated under any applicable State jurisdiction and/or under NEPA. **(Response #9)**

Interchanges and Indirect Impacts to Water Quality and Public Health

An additional interchange at the Greene-Monroe County line, connecting west to SR 45, is added to the original Tier 1 interchange alternatives and included as part of the preferred alternative for the Section 4 Tier 2 DEIS. The proposed Greene-Monroe County Line interchange connects into SR 45 about 5-6 miles north of the previously proposed and retained SR 45 interchange. This additional third interchange would add

greater accessibility to this stretch of SR 45 and to the regional/local road network, including a direct connection to SR 445 and SR 54, providing greater access to the rural areas of southwest Monroe, eastern Greene and northwest Lawrence Counties.

Accessibility and traffic congestion statistics at the proposed interchanges have been examined in the DEIS. There is the need to consider the impacts of allowed/induced development in a sensitive area as a water quality and public health issue. Highway interchanges can promote immediate nodes of commercial development for traveler services and community needs. They can also allow or promote access to more remote residential and commercial locations. Access to and from the proposed new interchange has shifted the immediate development area to the west through an approximately 1-mile long connector road. The DEIS identifies that the shift was made for accessibility from SR 45 and in part to move the local access connection slightly beyond an area with a higher amount of karst geology.

Eastern Greene County and nearby areas of western Monroe and likely northwest Lawrence Counties rely exclusively on on-site wastewater treatment through septic systems. We are concerned about the potential for indirect impacts from the development that the new highway interchange will accommodate and promote in this attractive but sparsely developed rural area. The DEIS identifies that water quality impacts from poorly functioning wastewater treatment systems could potentially adversely affect surface and groundwater, drinking water wells and sensitive karst resources from additional development. However, discussion of the topic of indirect impacts to water, karst resources and public health is limited in the DEIS. It is an important consideration in this specific area and it needs to be augmented in the FEIS. The topic should be analyzed and presented in a spatial as well as a narrative format, explained as a whole, in order to fully inform the decision makers, review agencies and interested public.

Recommendation: We recommend the FEIS include a figure/map that identifies and depicts southwest Monroe County, east-central and southeast Greene County and northwest Lawrence County, the Preferred Alternative alignment with interchanges and connector roads and the following spatially represented information:

- the extent of the service areas of the various existing public and private rural water supply utilities,
- the extent any service areas for community wastewater collection, including the potential sewer extension from Bloomington,
- the extent of the residential areas that are served by their own individual drinking water wells and on-site septic systems,
- the location of karst features/densities, including specific identification of areas that include springs used for potable water,
- extent of areas with shallow bedrock, soils identified as to their suitability for use with on-site septic systems,
- the extent of areas where there are special health department or land use controls for septic system design and/or installation, each County's (Greene, Monroe, Lawrence) existing and proposed planned development areas in and near the identified induced growth areas,
- the extent of induced growth areas.

The figure/map should specifically identify those areas where surface and groundwater resources are particularly vulnerable due to one or more human or natural factors. The analysis should include identification and consideration of the recently adopted Greene County Comprehensive Plan, the Bloomfield Comprehensive Plan, the Greene County Economic Development Corporation's I-69 Corridor Plan, and the Monroe County Comprehensive Land Use Plan and its Transportation Corridor Plan for SR 37 / I-69. The FEIS should include a narrative discussion of the analysis and identify additional mitigation measures that could be undertaken by INDOT and/or local, county or state governments.

Many local conditions are challenging for the effective design, technical operation and maintenance of on-site wastewater treatment systems in the Section 4 project area. These constraints can include soil suitability, slope, high bedrock, karst areas with groundwater connectivity (and the potential for wastewater problems to impact groundwater and surface water). In addition, spread-out rural residential, commercial and industrial development makes wastewater collection by sewers cost-prohibitive for most areas. The Zanesville silt loam soil areas found along SR 45, for example, have limited permeability and wetness, limiting the use of standard septic drainage fields. Even when systems are properly designed and constructed, the effective long-term management and success of on-site wastewater treatment systems are difficult because they rely on the actions of multiple property owners.

Recommendation: We recommend the analysis include the consideration of any established or recommended local land use tools, or state/county public health tools that address residential and commercial development and long-term, effective on-site wastewater treatment.

Chapters 4 and 5 of the DEIS have a very limited discussion of local land use planning and regulation, and how that would inform this issue. Both Greene and Monroe Counties accepted I-69 planning grants and produced documents, including a first-time land use plan for Greene County, which is largely rural and has no zoning ordinance. The issues, discussion, results and conclusions of these grants with respect to indirect, induced, or anticipated increased growth, and its management, are not included in the DEIS, other than mention of areas of increased industrial/business park uses and a "Bloomington Urbanizing Area." Appendix T, on the planning grants, consists of a single page, indicating the participating communities with I-69 planning grants.

While many small pieces of the information can be found throughout the DEIS, a complete and orderly presentation, assessment (both narrative and spatial) assessment and conclusions on the issue of indirect/induced/allowed growth is missing and must be part of the FEIS. The study area for this assessment needs to contain available information on northwest Lawrence County, since that County would also have increased accessibility due to I-69.

Wetlands and Open Water Impacts

The DEIS has covered wetlands and open water resources impacts throughout the document. Efforts to avoid and minimize impacts to wetlands and ponds have been

made. The proposed bridging of the wetland-stream complex at Black Ankle Creek by Koleen is desirable, as shown in Figure 6-2.

Recommendation: We note a technical misstatement on wetland “delineation” on p. 6-58, and possibly elsewhere in the DEIS. A wetland *determination* has been made, based on field observations, and gives us a much better idea about wetland resources than considering the National Wetlands Inventory maps alone. This is an acceptable level of information for the NEPA process. A formal wetland *delineation* will be done, using a specific required methodology, as part of any application for a Clean Water Act Section 404 permit.

Of the approximately 41.5 acres within the project study corridor, the DEIS has estimated impacts to 5.26 to 13.09 acres of wetlands/open waters. Project design work should endeavor to further reduce the amount of wetland and open water impact, where possible. As with streams, special attention needs to be given to protecting the “avoided” wetlands from sedimentation impacts during construction. Ample amounts of compensatory mitigation are being proposed to offset any unavoidable losses to wetlands. Please see more on compensatory mitigation below.

Recommendation: A technical clarification on the EPA role in Federal jurisdiction should be made on pages S-46, 5-429, 5-635 and possibly elsewhere: EPA reviews and has the authority to make the final decision on the Federal jurisdictional determinations as part of its responsibility in jointly administering Section 404 of the Clean Water Act. We recommend this be corrected in the FEIS.

Stream Impacts

Permanent and temporary stream impacts are a major aquatic issue and source of adverse aquatic impacts for Section 4 of the proposed I-69 highway. Substantial amounts of data are included in Appendix M, the Draft Stream Assessment Report, with each stream segment in the study area identified and provided with an assessment of its structural quality, including the survey data sheets.

The text of the DEIS sums up the considerable length of stream channels proposed to be permanently adversely impacted by the cross-country location of a major new highway. Proposed Alternative 2 will potentially impact 16,316 to 22,658 linear feet (LF)—about 3.0 to 4.3 miles—of stream channels. The exact amount of impact will depend on a mosaic of project design selections made post-FEIS/ROD, in part, by choosing between the initial design criteria and the low-cost design criteria for each of the preferred alternative’s eight subsection alignments. While the quantity of stream impacts are highlighted in the DEIS, the quality of the water resources being lost or modified is not sufficiently discussed. Full use has not been made of the stream data collected. In the following comments, we expand on this topic and make recommendations for better incorporation of stream quality information into the text of the FEIS.

Perennial and Riffle-Pool Streams: With one possible exception, all of the perennial streams inventoried in the study corridor, totaling 6,674 to 9,404 linear feet, have a riffle-pool structure, as indicated in the data sheets of the Ohio Qualitative Habitat Evaluation Index (QHEI) in Appendix M. The one possible exception may be Black Ankle Creek (stream S4-076) which was scored during bank-full conditions, which may have obscured

the stream structure. The QHEI assessment for the creek should be field verified under more representative conditions. The important information on structural quality is not included in Results narrative of the stream assessment report or a clear theme in the text of the DEIS. Riffle-pool streams need to be discussed as a stream resource and quality topic, as well as a mitigation topic (**Response #6**). Streams with a riffle pool structure are regulated as Special Aquatic Sites, as are wetlands, under the Section 404(b)(1) Guidelines, at 40 CFR Part 230.45. For the future 404 permitting purposes, alternatives avoiding Special Aquatic Sites are presumed to exist for non-water-dependent activities, such as highways, and impacts to riffle-pool streams and wetlands must be avoided. While this is a matter that will be significant during 404 permitting, it is important information to include in the FEIS as an indication of the quality of the resource within the project area and as a reminder of areas to avoid. From our review of the DEIS, it appears that most or all of the riffle-pool streams will be bridged. This is highly desirable and needs to be confirmed or clarified.

Recommendation: We recommend incorporating the important information on stream structural quality as identified above into the main discussions of the FEIS and into the Results narrative of the stream assessment report.

Recommendation: We request that the FEIS clarify whether most or all of the riffle-pool streams will be bridged.

Intermittent and Ephemeral Streams: The study corridor contains 20,286 to 25,701 linear feet (3.8 to 4.9 miles) of intermittent streams and 66,150 to 77,696 linear feet (12.5 to 14.7 miles) of ephemeral streams. For the discussion of stream resources and quality, the box on page 5-443 presents a “thumbnail sketch” of the stream resources in the study area and sums up the ephemeral streams as being of low to moderate quality. This is misleading. A notable aspect of Section 4 is the higher stream quality and the lack of stream alteration compared to the streams of other sections of the proposed I-69 highway in Indiana. Stream structural assessment scores using the Ohio’s Headwater Habitat Evaluation Index (HHEI) methodology, and the data in that summary box, show that of the 273 assessed segments, 78 are the top quality Class III (unmodified channels, by definition of the class) and 68 are Class II with a natural channel or high scoring Class II with a modified channel. This total of 146 segments represents 53.5 percent of the study area, with intermittent and ephemeral streams being of very good quality or higher. The perennial stream reaches in the Alternative 2 path have habitat quality scores ranging through the good to the exceptional ranges. Part of this is manifest in their riffle-pool structure. Although the HHEI and QHEI ratings carry no specific regulatory actions in Indiana, they point to the quality range of a resource where impacts can be substantial under the Section 404(b)(1) Guidelines in permitting.

Recommendation: We recommend additional information regarding stream quality data as identified above be appropriately incorporated in the discussion of stream quality in the FEIS and in consideration of the environmental impacts of the proposed project.

The DEIS depictions and text of the Preferred Alternative 2’s route across the terrain in this complex study area, make it laborious to associate the areas of permanent impact and impact reduction to specific stream reaches. The stream surveys have an orderly numbering system and these inventory numbers are used in Appendix A of Appendix M and Table 5.19-5. However, the identification of the stream segments impacted need to be carried into the discussions of specific impacts in the narrative of the text. For

example, some aquatic resources (stream channels, floodplains and wetlands) will be bridged. Page 5-445 discusses bridging at certain areas by the name of the stream, but some named streams have multiple inventory segments in the study area. Adding the inventory numbers to the discussion, possibly supplemented with a new associated table, will more clearly present stream impacts in the FEIS.

Recommendation: We recommend the stream inventory numbers be added to the maps and discussion to more clearly present stream impacts in the FEIS. If possible, supplement with an associated table.

Some stream crossings in Table 5.19-5 have zero feet of impact; it is not clear if this is because that stream reach is completely avoided by the anticipated pathway choices for the preferred alternative or if it represents complete bridging of that stream segment, with no structural piers, or something else. The bridge/grade separation maps for the alternatives are presented in Figure 6.2. Streams are highlighted here on the aerial photo base maps, but do not have the numerical identification code for the specific stream segments. The project reviewer or decision official must make a visual cross walk with map series 6.2 and the location-coded map set in Appendix M.

Recommendation: To provide more clarity in the FEIS, please label the maps of Figure 6.2 with the stream segment inventory numbers and be specific, by stream segment number, in the narrative and tables of the FEIS for the exact stream reaches being affected (or potentially affected, depending on the final design option selected).

All Streams: It is unclear if any of the crossings may need associated stability measures for the bridging that may result in dredging or filling the riffle-pool stream and its banks. This might include such activities as channel re-alignment, rip rap or bridge pier placement. In situations where channel stabilization is planned, stream bank bioengineering methods should be evaluated as an alternative to rip rap. Rip rap may also be used to protect the toe slope stability of a silt-clay stream bank, rather than adding the weight of armoring the entire slope, in specific situations. These methods would also contribute to wildlife value, since rip rap makes animal passage under bridges more difficult. Alternative 2 involves 39-44 potential stream relocations, which will each impact stream quality and potentially affect channel stability equilibrium above or below the direct impact area.

Recommendation: We recommend the FEIS identify the stream crossings that may require stability measures for the bridging that may result in dredge or filling the riffle-pool stream and its banks.

Well-designed box culverts are a preferable choice to pipe culvert design. Page 5-445 indicates 34 crossings with either 3-sided structures wider than 29 ft. or oversized culverts.

Recommendation: The FEIS should indicate the construction choice (or at least alternative choices) proposed for each specific stream crossing. The text should indicate the size and design of a "large culvert." If this is information developed in the analysis of wildlife issues, its location should also be cross-referenced from the water discussion in the FEIS.

Temporary Construction Impacts: Temporary construction impacts to streams have the potential to be severe in Section 4. Constructing a new highway to Interstate

standards, cross-country over steep terrain with valuable aquatic resources, will be challenging. Stream quality must be effectively protected. The set of Best Management Practices (BMPs) commonly used for Indiana highway construction may be inadequate for a large project in steep topography. Consultation with other States and sources for suitable BMP approaches and practices in steep, hilly terrain should be used to protect streams and water quality in Section 4. Project-appropriate construction BMPs will also be under our consideration in Clean Water Act Section 404 permitting.

Recommendation: We recommend the FEIS identify the specific construction BMPs that could be used to successfully protect surface and groundwater quality under the variety of conditions, such as steep slopes and karst terrain, associated with Section 4.

Mitigation and Compensatory Mitigation

Compensatory Mitigation: Compensatory mitigation needs to be provided for unavoidable dredging or filling of streams, including relocations. This can be done by natural channel preservation, or in some cases, stream restoration or enhancement. EPA and the Corps of Engineers jointly administer Section 404 of the Clean Water Act. Under current practices, stream impacts in Indiana are being assessed by linear feet rather than acres. On page 7-45, assessing impacts by acres underestimates the impacts to the linear nature and behavior of streams and mitigation needs and costs to offset unavoidable losses.

The approach to stream, wetland and upland forest mitigation for permanent losses was not substantially advanced in the DEIS document from Tier I concepts. Tier I presented a reasonable conceptual approach for searching for sites to provide conservation and restoration benefits for lost aquatic resources, forest restoration and non-aquatic endangered species concerns, within several geographic focus areas.

Additional project planning work on potential sites for mitigation has occurred since Tier 1, but was not reflected in the DEIS. Just before the DEIS was issued, EPA and other resource agencies were included in a site tour and briefing for a number of prospective mitigation sites in the geographic focus areas. All sites had some merit for certain aspects of mitigation for one or more resource concerns. We will continue to provide separate technical input on these sites.

Recommendation: We recommend the FEIS document the progress on compensation mitigation work that INDOT and their contractors have made and continue to make since the Tier 1 ROD.

Recommendation: The FEIS should discuss and include the up-to-date compensation mitigation plan. This may be in greater detail for secured sites and more general for sites under consideration.

The DEIS does not reflect the big job that stream mitigation will need to be, even when stream preservation is integrated into the forested and other mitigation sites. Because the DEIS underestimates the amount of stream compensation needed, further work may need to be done to locate a sufficient quantity and quality of stream mitigation.

Recommendation: The FEIS should identify how juggling of mixed-use mitigation objectives will be accomplished and which values may prevail over others in the site selection process. (Response #1 and #2)

From an aquatic resources perspective, a promising wetland and stream mitigation approach would be to work on sites where it is possible to restore drained wetlands next to a stream. From the water's edge, this would include maintaining or enhancing a healthy riparian corridor in native vegetation, at least 100-ft. on each side from the mid line of the stream, for a 200-ft. corridor. If appropriate, some natural stream channel restoration or enhancement would be included. Restoring hydrology on hydric soils in adjacent bottomland farmland or fields would be the start of a sound, self-sustaining process to restore wetlands. Beyond the wetland, upland forest restoration would complete the mitigation landscape complex. All species used for mitigation should be native to this region of Indiana.

As a difficult-to-replace aquatic resource, stream mitigation may encompass preservation under the EPA-Corps Mitigation Rule. A good opportunity for stream preservation will be within the I-69 Section 4 forest preservation mitigation sites. Additional linear feet of stream mitigation could come from stream corridor enhancement projects within reforestation sites.

Several potential mitigation sites along Plummer Creek near Kolen show promise, especially if they can be merged together into a larger parcel. A combination of mitigation activities would fit together well together here. This can start with stream channel restoration and moving the channel away from the road, allowing the natural positioning within its floodplain over time. The new location must provide space for a suitable minimum 200-ft wide riparian buffer corridor, to protect the perennial stream. Any wetland restoration associated with this complex should first rely on the opportunities from altering old agricultural drainage, rather than by extensive berming or excavation.

Stream channels occurring in areas of shallow or exposed bedrock are best preserved or protected by a riparian corridor, rather than by attempted channel modification "improvements."

Recommendation: We recommend wetland and forest restoration be calculated in acres and stream corridor restoration/enhancement be calculated in linear feet, encompassing both banks as one stream length, rather than counting double linear credit for work on both banks. No less than 50 feet of buffer on either side of an intermittent or ephemeral stream, for a minimum 100-ft. corridor, should be used. Opportunities for the buffer to be even wider are desirable.

CWA Section 404: EPA's position is that the quantity and quality of Federal jurisdictional stream resources proposed to be relocated or permanently lost in this project, 93,100 to 112,801 linear feet (17.6 to 21.4 miles), will need formal compensatory mitigation in 404 permitting, no matter what permitting tool is chosen by the Louisville District of the Corps of Engineers. Any of these streams which prove to be outside of current Federal jurisdiction should be mitigated under any applicable State jurisdiction and/or voluntarily under NEPA. (Response #9)

This is a much more extensive quantity of stream mitigation than the calculations by acres assumed in the DEIS. Stream mitigation needs to maximize preserving and restoring the existing natural drainage network. It should not rely on simply inserting “naturally-structured” channels with reduced catchment size in new locations. Projects are substantially more effective when both banks of the stream can be protected through riparian corridors. Unfortunately, land parcel boundaries are often drawn up with a stream as a boundary.

Recommendation: When assembling parcels for mitigation sites from the known array of prospective sites with interested cooperating owners, we recommend additional inquiries be conducted to see if the landowners on any excluded opposite stream bank are willing to consider a riparian corridor easement. Including the opposite bank would add to the quality, quantity, long-term effectiveness, and stability of the stream restoration or enhancement project.

As mitigation plans are made, suitable wetland and stream mitigation performance standards will need to be developed, incorporating both physical and biological standards.

Conservation Easements: The DEIS identifies that INDOT intends to purchase mitigation easements to protect mitigation sites in perpetuity. The mitigation lands will be turned over to an appropriate government conservation and management agency; will contain deed restrictions identifying them as mitigation sites and protecting them from further disturbance; will be planted with mixture of native trees largely composed of species having high value as potential Indiana bat roost trees; will include buffer areas around Indiana bat hibernacula; and will include obtaining easement for other protection measures for Indiana bat hibernacula. (DEIS pp. 7-4 through 7-6, 7-26, and 7-37 through 7-39.) (INDOT Answer #14)

Recommendation: We recommend the FEIS clarify whether INDOT will provide sufficient funds to the government conservation and management agency to support maintenance of the sites in perpetuity and the education of current and future landowners about the mitigation projects and about being good land and water stewards. In addition the FEIS should identify whether there will be a way to enforce or correct any misplaced actions/inactions by the easement-granting landowners that may adversely impact the integrity of the mitigation site. The easement agreements should be clear about whose job it will be to enforce the terms of the easements. (Response #14)

KARST RESOURCES

Recommendation: EPA recommends the FEIS address the following karst impact issues identified in the I-69 Section 4 DEIS:

Analysis of Karst Impacts as part of the Alternatives Consideration Process

We have concerns that the appropriate level of consideration was not given to the various karst feature types presented in the DEIS. As such, the alternatives analysis completed for Section 4 Corridor appears to have considered impacts to the seventeen different karst feature types as equals. With respect to karst resources, in order to adequately assess alternative impacts, consideration must be given to karst feature size, location, infiltration rate, recharge/discharge characteristics, connectivity to

groundwater conveyances, potential T&E species impacts, potential water quality impacts, threats to the traveling public, etc. For example, impacts to a sinking stream should not be weighed equally to impacts associated with a low-infiltration sinkhole. The fact that an alternative impacts a lower number of karst features does not necessarily guarantee that it will result in the least amount of environmental impacts. Assigning weights to each karst feature type based on their quality, connectedness, and sensitivity will ensure that the karst impacts associated with each alternative are adequately assessed.

Potential Impacts to Unknown Subsurface Karst Features

The DEIS acknowledges that the methodology developed for the karst survey included only those karst features that could be visually observed (i.e. surface features). The DEIS states that direct impacts to caves were avoided during alternative development and thus no direct impacts to known cave habitats and/or cave biota are anticipated. At the same time, the DEIS acknowledges that unidentified subterranean karst features are present and an unknown number of those features will be encountered during highway construction. How can a determination of no direct impacts to cave habitat or cave biota be made given the acknowledged lack of information related to subsurface karst features, specifically their size and location? The lack of subsurface karst feature data poses a severe threat to karst environments during construction of the proposed highway facility. The importance of identifying subsurface karst features early in the design phase is important as the exposure of subsurface karst complexes and the severance of groundwater conveyances can have negative consequences, particularly to karst fauna and flora and the quantity and quality of private/residential water supply features.

Potential Impacts on Drinking Water Quantity and Quality

The DEIS identified numerous private groundwater wells within and adjacent to the Section 4 corridor. Furthermore, the DEIS indicates that in some cases karst springs are utilized as a private/residential water supply alternative. The proposed action could potentially result in changes in drainage patterns to and from karst features if construction were to eliminate recharge features, sever conduits, and reduce flows. The result could be a reduction in water availability for landowners who rely on said water supply features for residential or agricultural uses.

Karst recharge features act as direct conduits to groundwater conveyances and supplies. Stormwater runoff, both during and following construction of the proposed highway facility, is a serious threat to groundwater quality if appropriate pre-construction and post-construction BMPs are not identified, implemented, and maintained. Induced development resulting from construction of the proposed highway facility can also impact groundwater quality through the addition of septic systems and impervious surfaces within karst zones of susceptibility.

Karst Fauna Study Methodology

The Section 4 cave inventory effort identified 63 caves within the study area, including 14 caves with entrances located within the Section 4 corridor. As noted in Section 4 Survey of Karst Features Report, 6 caves “within and in proximity” to the Section 4 Corridor were sampled to determine the presence of invertebrates. These sites were

selected based on known hydrologic connections to the corridor confirmed by dye tracing which had been completed at that time the Karst Fauna Study was performed. EPA understands that a cave fauna survey that includes all accessible caves within, or directly adjacent to, the Section 4 corridor would better characterize cave fauna and further demonstrate a commitment to “meet Indiana’s transportation needs in an environmentally sensitive manner that protects the habitat of all species,” as outlined in the 1993 Karst MOU. The additional cave fauna studies would assist in providing a better understanding of all potential direct and indirect/secondary impacts associated with construction of the proposed action, while also helping with the selection and refinement of mitigation measures and best management practices for protecting the biological integrity of karst resources.

Variability in Flow Conditions as Part of the Pollutant Loading Analysis

The pollution loading analysis model presented appears to utilize a high bias on the quantity of water involved in pollutant mobilization. A high water volume coupled with a static pollutant load will result in a lower concentration when compared to regulatory criteria. We recommend that the analysis include a typical versus extreme rain event, mobilizing the same pollutant load. This is important as the results of this analysis will yield a result more representative of natural conditions.

Construction Blasting

EPA understands that blasting may need to be used quite frequently in karst areas. Blasting can cause structural damage to buildings and wells, and cause the collapse of karst subsurface openings, such as cave walls. The DEIS does not identify the specific measures that will be required before, during and after blasting to insure that the integrity of structures, wells and karst subsurface openings remain intact.

Identification of Mitigation Measures for Karst Areas

With respect to highway construction, EPA understands that one of the most important mitigation BMPs is the lining of drainage ditches. These features concentrate water in areas that may not have been subjected to surface flow in the past. We understand that a study conducted by the Tennessee Department of Highways discovered that 74% of the sinkholes observed during the study were located in the highway ditch lines. Further, 91% of the sinkholes opened up in unlined drainage ditches.

The identification and estimates of the types of BMPs that are going to be required on a project is important so that the contractor can prepare a responsive bid. This will be especially true for a Design/Build project delivery since we understand that the schedule is usually very tight and construction claims are not contractually allowed.

The following is a partial listing of mitigation or protection BMPs that have been used in karst terrains across the United States.

Ditch Lining BMPs

- Compacted Clay Liners
- Geosynthetic Clay Liners
- Flexible Membrane Liners
- Concrete, Portland cement or asphalt.

Sinkhole Remediation BMPs

- Bridging Alternatives
 - Land bridges (below grade)
 - Culvert or bridges
 - Reinforcing within cave
 - Ground Modification
 - Geopier with cap
 - Piles with caps
- Filling Alternatives
 - Rock Pads
 - Large Rockfill
 - Compaction Grouting (soil)
 - Cement Grouting (voids)
 - Dynamic Compaction
 - Excavation, overlapping geotextiles, soil backfill
 - Excavation, concrete cap, soil backfill.

Other Karst Feature Protection BMPs

- Avoidance
- Earth Berm Construction
- Gabion Berm Construction
- Open Standpipe Installation
- Concrete Catch Basin Installation

The identification and implementation of construction and storm water related BMP's for a karst environment is extremely important because of the physical and environmental sensitivity of karst features, flora, and fauna. It is of critical importance that the potential or preferred BMP's for mitigating or protecting karst features be identified early as possible in the design process (preliminary design stage). EPA understands that this is particularly important for a Design/Build (D/B) project delivery since this method is extremely time sensitive and contingencies for further investigation or consensus building are generally not part of the project schedule. We understand that BMP's should be included in either the D/B project specifications or in the Preliminary D/B plans that will be used to produce the D/B bid.

Recommendation: We recommend the FEIS explain INDOT's proposed project development and contracting process for Section 4. Please provide a process timeline and approval authority for incorporation of project-specific design elements/features and BMPs required by INDOT for project construction and operation. We understand that decisions regarding the best approach to take during construction when encountering a karst feature will be made at that time, specifically for each particular karst feature encountered. However, at the very least, we recommend the FEIS provide a list/matrix of appropriate design elements and BMPs for specific situations that are likely to be encountered during final project design, construction and operation and include cost estimates for each design feature and BMP. We suggest this list/matrix could serve as the

starting point from which INDOT, the Karst MOU resource agencies, the designer and/or construction contractor may choose from to mitigate impacts to these karst features.

AIR QUALITY

Air Conformity: The DEIS (Section 5.9, page 5-243) correctly identifies Greene County is a maintenance area for the 8-hour ozone standard. The County is currently in attainment of the standard and is under an approved maintenance plan. The conformity determination requirements for the I-69 project in Greene County will be determined after further agency consultation (page S-48). The FEIS/ROD will include the regional and project level conformity demonstration updated as appropriate to reflect the proposed implementation timeline (S-49). The DEIS goes on to state that the results of any conformity analysis will be discussed in the FEIS (5.9.7 Conformity Findings (page 5-243).

Recommendation: EPA recommends the FEIS include the FHWA conformity determination, discussion and supporting documentation.

Mobile Source Air Toxics (MSAT) (Section 5.9, pages 5-233 – 5-243). A qualitative assessment of mobile source air toxics (MSAT) is provided in the DEIS. However, it is unclear why forecasted average daily traffic (ADT) of vehicles per day for roadway segments in Section 3 were used instead of Section 4 (page 5-234, first full paragraph).

Recommendation: We recommend the FEIS use ADT specific to Section 4 or explain the rationale for using Section 3 ADT in the Section 4 MSAT analysis.

Greenhouse Gases/Climate Change (Section 5.9, page 5-235): One paragraph in the DEIS is devoted to addressing greenhouse gas emissions associated with the project and climate change. The DEIS states that FHWA does not believe it is informative at this point to consider greenhouse gas emissions in an EIS. The DEIS goes on to identify that FHWA is actively engaged in activities with the USDOT to assess the risks to transportation systems and services from climate change.

Recommendation: We recommend the FEIS identify and discuss any anticipated effects of climate change on the project. For example, discuss any effects that predicted increases in the number and/or intensity of precipitation events due to climate change may have on sizing bridge spans, culvert openings, and stormwater management measures in order to accommodate such events and ensure public health and safety.

Air Quality Mitigation During Construction (Section 7.3, page 7-16): Even though Section 4 is a relatively rural area, exposure to diesel exhaust by construction workers and those nearby construction sites can have serious health implications. In order to protect air quality in the project area during construction, we recommend INDOT consider additional strategies to reduce diesel emissions, such as project construction contracts that require the use of equipment with clean diesel engines and the use of clean diesel fuels, and limits on the length of time equipment is allowed to idle when not in active use (EPA recommends idling not exceed 5 minutes).

The Section 4 FEIS should discuss the feasibility of utilizing construction contracts that require the use of equipment with clean diesel engines and the use of clean diesel fuels,

and limits on the length of time equipment is allowed to idle when not in active use. In addition, the FEIS should identify whether or not INDOT will consider or commit to implementing these and/or additional strategies, including but not limited to, formalizing INDOT actions for the entire I-69 project by developing and implementing a construction emissions reduction plan as recommended in our June 3, 2009, letter regarding the I-69 Tier 2 Section 3 DEIS.

UNDERGROUND INJECTION CONTROL (CLASS V PERMITS)

Permits (Section 5.23.8 EPA Class V Permits, and Chapter 7 (page 7-43))

EPA would determine on a case-by-case basis whether or not an individual permit would be required for any Class V well under the Safe Drinking Water Act.

Recommendation: We suggest the following changes be made in the FEIS for Chapter 7 (Mitigation, page 7-43) regarding Class V permits: Instead of stating “. . . A permit would be required if underground sources of drinking water would be negatively impacted” it is more accurate to state, “EPA would determine if a permit is required for any Class V injection well that may contaminate an underground source of drinking water.”

Recommendation: Regarding, Chapters 5.21.4 (page 5-596) and Chapter 5.23.8 (page 5-637) we offer the following clarifying language for the FEIS:

“Class V injection well permits may be required for various types of projects. For example such a permit could be required by EPA Region 5 if a Class V injection well is located within the karst region of the state, a sole source aquifer area, a state designated source water protection area for a public water supply, or anywhere untreated fluids discharged through a Class V well may otherwise endanger an underground source of drinking water. If there are measures in place to prevent contamination of groundwater, a Class V well could be authorized by rule rather than by a permit. A Class V Well Inventory Form would need to be provided to EPA Region 5 prior to construction of a Class V injection well so that EPA could determine if a Class V injection well permit will be required for any Class V wells. For the I-69 project, if the inventory information provided indicates that any injection well would likely contaminate any underground source of drinking water, a permit would be required. Any permit would need to be applied for and obtained prior to construction of the Class V well.”

For additional information regarding EPA Class V permits and UIC program, contact Ross Micham, at 312/886-4237 or at micham.ross@epa.gov.

EPA Technical Adequacy Review of the I-69 Evansville to Indianapolis Tier 2 Studies - Survey of Karst Features Report, Section 4, US 231 to SR 37, Contains Confidential Information, dated June, 2010.

[Note: A redacted version of the Karst Features Report is included in Appendix AA of the Section 4 DEIS.]

Karst Fauna Study Methodology

The Section 4 cave inventory effort identified 63 caves within the study area, including 14 caves with entrances located within the Section 4 corridor. As noted in Section 4 Survey of Karst Features Report, 6 caves “within and in proximity” to the Section 4 Corridor were sampled to determine the presence of invertebrates. These sites were selected based on known hydrologic connections to the corridor confirmed by dye tracing which had been completed at that time the Karst Fauna Study was performed.

EPA understands that a cave fauna survey that includes all accessible caves within, or directly adjacent to, the Section 4 corridor would better characterize cave fauna and further demonstrate a commitment to “meet Indiana’s transportation needs in an environmentally sensitive manner that protects the habitat of all species,” as outlined in the 1993 Karst MOU. The additional cave fauna studies would assist in providing a better understanding of all potential direct and indirect/secondary impacts associated with construction of the proposed action, while also helping with the selection and refinement of mitigation measures and best management practices for protecting the biological integrity of karst resources.

Variability in Flow Conditions as Part of the Pollutant Loading Analysis

The pollution loading analysis model presented appears to utilize a high bias on the quantity of water involved in pollutant mobilization. A high water volume coupled with a static pollutant load will result in a lower concentration when compared to regulatory criteria. We recommend that the analysis include a typical versus extreme rain event, mobilizing the same pollutant load. This is important as the results of this analysis will yield a result more representative of natural conditions.

Executive Summary

Results, Karst Mapping [Pages vii through vii]

What is the difference between “Karst features relevant to the corridor” and “Karst features within the corridor”? What specifically makes a feature relevant?

The report states - “*Mapped Karst features relevant to the corridor: 63 caves, 14 within the corridor. “ There are 315 known caves located within five miles of the Section 4 corridor.”*

What defines “relevant” to the project if the dye tracing average extent was over 5,200 feet and some traces exceeded 20,000 feet?

1.0 Introduction

1.1 Purpose and Scope

[Page 1]

The report states - “...and Karst experts knowledgeable about the area”. Who are the karst experts that are knowledgeable of the area? Please clarify who was consulted.

1.5 Geologic Setting

[Page 4]

Provide geologic data on Figure 4 to facilitate interpretation of the influence of the bedrock geology on karst formation within the project limits. Include formation/member croplines as well as structural information [dip direction].

1.5.5 Mining Operations [Page 6]

The report states - “Based on the results of field reconnaissance and coordination with IDNR and IGS, these excavations have apparently become overgrown and non-discernable due to their shallow nature.” This statement does not address the potential impacts of these abandoned underground mine workings. Unregulated ‘house’ or ‘farm’ mines are known to extend several hundred feet from outcrop entrances. Shallow workings are of greater concern than deep abandoned workings. To state that they are “overgrown and non-discernable” does not define the potential construction risk, future roadway collapse, acid mine discharge potential, or habitat loss. Many abandoned mines are roosting places for a number of bat species.

1.6 Hydrogeologic Setting

1.6.1 Water Supply [Page 8]

The report indicates that groundwater and surface water [including springs] are combined sources of public water supplies in Section 4. However, the report does not address how the project may impact public water supplies. Provide the following:

- Locations of public water supplies relative to alignment.
- Extent of recharge areas for surface/spring water sources of public water supply.
- Depths of public water supply wells with radius of influence information.

Furthermore, the report needs to more directly indicate what karst features provide private/residential water supply. Annotate Figures 29-31 to indicate which springs serve as private/residential water supply. We suggest conducting baseline residential water sampling at locations of anticipated impacts over 4 quarters to capture seasonal fluctuation in drinking water quality. Discuss impacts to these sources in the report, as well as the planned impact mitigation measures should these sources be impacted by construction.

2.0 Methodology

2.2 Karst Feature Identification

[Page 14]

The report states - *“Under the Karst MOU, if during construction unknown features are identified, the MOU signatory agencies will be contacted and an agreement regarding the proposed treatment of the feature reached prior to work continuing in that specific area of the project.”* How would treatment for a discovered karst feature be different from a known karst feature? If a swallet is ‘discovered’ during construction that was not inventoried during design, would the mitigation be any different? If treatment options are not discussed for features uncovered during construction until construction begins, serious construction delay claims can be expected.

2.3 Dye Tracing Methodology

[Page 16]

Provide the methodology used in determining what constitutes a “relevant” discharge feature for dye tracing sampling network development.

2.4 Dye Trace Field and Laboratory Procedures

[Page 19]

Provide justification for the positive analytical detection criteria listed. As listed, several potential lower level positive results will be discounted. The result of this will be a smaller area of recharge assumed per discharge point. Reinterpret analytical results accepting all positive results above the method reporting limit [signal to noise ratio]. Revise Appendix H figures to reflect changes in interpretation.

2.5 Pollutant Load Estimates

2.5.1 Pollutant Loads from Highway and Right of Way [Page 20]

Does the pollutant model rely on dilution based on current flow conditions? If so, the cited assumptions are invalid. The text assumes karst features, presumably recharge sources, will be capped and filled. Subsequent statements indicate spring boxes will be utilized to perpetuate natural flow conditions. How will the construction plans ensure beheaded drainage is routed to ensure flow conditions of the pollutant loading model are preserved?

Conduct background testing of pollutant loads representative of actual pre-construction conditions to refine the pollutant load model.

The final paragraph cites the trend of SR 37 construction regarding Total Suspended Solids (TSS)/Total Recoverable Metals (TRM) data as returning to pre-construction conditions within two years. How can the owners ensure this without an assessment of the “pre-construction conditions”? Conduct baseline sampling of pollutants of interest and present the results in the revised report.

2.6 Review of IDNR Water Well Data

[Page 20]

The report provides a justification to disregard the USEPA recommendation to examine local water table trends when considering flow conditions under which dye traces were

conducted. The study needs to consider this to evaluate localized areas where the phreatic surface and epikarst flows are intermingled. This analysis cannot simply be ignored due to difficulty in obtaining the data to do so. Several mentions are made as to the traces being conducted under “high flow” conditions. Provide the methodology for determining when the flow conditions were deemed high. Does this correspond to a seasonal high water table?

3.0 Results

[Pages 21 through 61]

Based on inadequacies of the experimental design, results presented may not be representative of existing conditions. USEPA will re-evaluate based on the additional information requested.

3.1 Karst Features

3.1.1 Caves [Pages 22 through 45]

Throughout the cave discussion the phrase “where appropriate and practicable” is used extensively. Who is going to determine what is “appropriate and practicable”? It is confusing whether the report is or is not recommending that the karst features be mitigated.

The discussion of caves both in the executive summary and the report body mention that certain caves are 500 feet from the corridor and therefore will not be impacted. Other karst transportation studies have indicated that cave dwelling fauna are known to forage over 500 feet from cave openings. This is not just from the cave entrance but any swallet, fracture, or other karst window. With respect to caves, direct or indirect/secondary impacts have the potential to extend beyond the entrance or underground extent of the opening.

Figure 9 [Page 75]

The drainage area shown for Bauer Cave appears to be too small. We recommend the preparer revisit this calculation to ensure that the drainage area included in this Figure is representative of the actual drainage area. Increase to capture the uphill drainage similar to the method used for the remainder of the cave drainage area estimates.

4.0 Surveys of Section 4 Caves

Includes Appendix K – Survey of Section 4 Cave Fauna [Page 62]

The Section 4 cave inventory effort identified 63 caves within the study area. This included 14 caves with entrances located within the proposed corridor. As noted in the subject report, 6 caves “within and in proximity” to the Section 4 Corridor were sampled to determine the presence of invertebrates. These sites were selected based on known hydrologic connections to the corridor confirmed by dye tracing which had been completed at that time. While the methodology and technical accuracy of the karst fauna survey is not in question, we question why such a small percentage of caves were inventoried as part of the karst fauna analysis. It is our understanding that additional dye tracing activity has been conducted since completion of the December 2006 cave

fauna study. As noted in Section 7.0 Summary and Conclusions, 7.2 Dye Tracing, Page 108, an additional 4 cave features were discovered to have a hydrologic connection to the corridor as a result of dye tracing activities; none of which were included in the 2006 Cave Fauna study. This includes Goodes Cave, Hugentober Blowhole Cave, Nudist Cave, and Rush To It Cave.

We recommend that the final report contain expert opinion from the principal author, Dr. Julian Lewis, as to why such a small percentage of caves were sampled. We recommend INDOT consider that any accessible cave within the project study area, or that which could be influenced by surface or subsurface hydrology associated with the corridor, be surveyed. This includes those caves with hydrologic connections, as identified through the most recent round of dye tracings completed for Section 4. The additional cave fauna survey should also include any additional cave features that are not hydrologically connected and yet may contain unique cave fauna populations worthy of consideration.

EPA suggests that a cave fauna survey that includes all accessible caves within, or directly adjacent to, the project study area would better characterize project study area cave fauna and further demonstrate a commitment to “meet Indiana’s transportation needs in an environmentally sensitive manner that protects the habitat of all species,” as outlined in the 1993 karst MOU. Additional cave fauna studies would also assist in providing a better understanding of all potential direct and indirect/secondary impacts associated with construction of the proposed action; while also helping refine best management practices for protecting the biological integrity of cave resources.

5.0 Annual Pollution Load Estimates

[Pages 64 through 65]

INDOT’s Previous Karst Study on SR 37

The report states that the treatment feature (peat filters and rock filters) “clogged” between the end of construction and the 2-year post-construction period of monitoring. How does the report justify implementing a treatment alternative that was demonstrated to be ineffective?

Kentucky’s Previous Karst Study on I-69 at Mammoth Cave

It appears as though the subsection titled, *Kentucky’s Previous Karst Study on I-69 at Mammoth Cave*, should be I-65 not I-69.

[Pages 66 through 67]

The model presented utilizes a high bias on the quantity of water involved in pollutant mobilization. This high water volume, with a static pollutant load, will result in lower concentrations when comparing with regulatory criteria. Provide analysis of a typical [vs. extreme] rain event, mobilizing the same pollutant load, which may be more representative of anticipated conditions.

EPA would like to see a comparative analysis of low flow (average rainfall event) conditions versus a high flow conditions (extreme rainfall event). Evaluating varying flow conditions is key component of pollutant loading studies as the volume of water represents the denominator of the calculation and thus has an impact on loading concentrations. If a pollutant load remains constant throughout the study, a higher volume of water will essentially dilute the concentration and thus the results will fall below regulatory criteria. Providing a comparative analysis of high flow versus low flow conditions would provide results which better represent natural conditions.

6.0 Potential Measures to Minimize Impacts to Karst

6.4 Operation and Maintenance

[Page 70]

Is void filling an “appropriate and practicable” mitigation strategy? Void filling will isolate the underground opening on either side of the fill. Animal migration, water flow, and air flow would be drastically impacted. The damming effect could redirect the water into other ecosystems that are currently dry or cause a blow out on the ground surface or beneath an embankment section. In addition, introducing cementateous products into the voids would impact the temperature due to the heat of hydration, which could have a negative impact on the fauna.

Did the report examine the use of geogrid or geotextile layers in the lower reaches of construction embankment or roadway subgrades? This practice has been shown to be effective in mitigating piping/collapse of embankment over karst terrains.

The report states - *“Examination of the areas that receive runoff from the highway to detect soil piping or opening of buried karst features.”* What is the recommended frequency of these inspections? Who is qualified to perform them? Whose responsibility is it to perform them?

The report states - *“Improved technology should be used to update, maintain, and alter any treatment and containment structures when deemed necessary.”* What does this statement mean? Are there some pending technologies that may be applicable? If so, a discussion should be added.

The report mentions elsewhere that minimal salt use will be a strategy used for minimizing roadway pollution. This strategy should be included in this list as well.

7.0 Summary and Conclusions

[Page 107]

The report states - *“Therefore, the focus of alignment selection and design should be on minimizing the impacts on the karst system, and any biological communities within them, by avoiding critical features....”* What defines a critical feature? It would be helpful to provide a listing of the critical features considered as part of the alignment evaluation process.

7.5 General Environmental Concerns

[Page 114]

The second bullet item states “Groundwater flowpaths in a karst setting can vary under different flow conditions and groundwater flow across surface drainage divides in common.” Section 3.0 Results, 3.3 Summary of Dye Tracing Tests states that “When possible, dye tracing tests were conducted under natural high flow conditions. High flow conditions increase the likelihood of dye travelling to all possible discharge points.” With this said, this study fails to provide specific information on the flow conditions at the time each of the traces took place to document low flow versus high flow scenarios. Provide documentation which demonstrates that dye tracing activity has taken place during high flow conditions.

This documentation would include information pertaining to the date/time of collection and related rainfall/runoff discharge data. This information is usually documented on field data sheets or a study database.

The General Environmental Concerns section fails to acknowledge potential impacts to both the terrestrial and aquatic components of cave environments. Minute changes in temperature, humidity, and water quality can have detrimental affects to what are highly adapted species, intolerant of change. Various studies have documented the vulnerability of cave ecosystems as they relate to disturbances associated with roadway construction. We recommend adding a discussion that acknowledges potential impacts associated with altering the temperature and humidity levels within karst environments.

7.6 General Engineering Concerns

[Page 115]

Include a BMP in Section 8 that consists of diverting roadway drainage [from the full pre-construction drainage area limits] to the upgradient roadway offset to minimize “severance” of recharge and subsequent impacts to spring discharges and habitat alteration. For example, efforts should be made to bridge or culvert drainage so as to not severe flow and recharge to springs.

8.0 Recommendations

8.1 Best Management Practices

[Page 115 through 116]

There is no mention of a karst monitoring plan which evaluates cave community disturbances. We recommend that a monitoring plan be implemented that evaluates the physical habitat and includes population censusing prior to, during, and post-construction for those caves with a hydrologic connection to the corridor. Protocols for cave community censusing have been described by Dr. Jullian Lewis, the primary author of the Section 4 Cave Fauna study. This monitoring plan should also be considered as a potential mitigation measure in the Section 4 Final Environmental Impact Statement (FEIS).

Clarify “lined ditches” in this section. Ditches should include an impermeable geosynthetic liner to prevent infiltration of runoff before reaching detention/treatment basins.

Filling of karst features should be minimized to avoid introduction of non-native materials into the karst ecosystem. Where practical, employ impermeable geosynthetic liners with overlying geogrid embankments constructed to bridge karst features beneath the roadway.

General Comments

It appears that the potential impacts to the cave flora and fauna are not fully defined in this report. Additionally, the extent of the cave systems (i.e. mapped limits) and the potential impacts of the project on the caves and the potential impacts of the caves on the project are very lightly addressed.

It appears that the preliminary engineering aspects are also lightly discussed. Other than potential hydrogeologic impacts, there is no mention of how the construction activities will impact the karst features. Are the depths to caves or other openings going to be explored? Will driven piles be acceptable foundation alternatives? Will construction vibration affect delicate cave features and ecosystems?

SECTION 4 DEIS - DOCUMENT CLARITY – ERRATA: FIGURES/MAPS, TABLES, DEFINITIONS

Errata Notes on Tier 2 Section 4 DEIS, I-69 (Indianapolis to Evansville)

Table of Contents

Problem: (p.xxiii, Disk 1, Appendix A and Appendix B). Appendix A and Appendix B are misrepresented here as containing the *Business Needs Survey* and the *Traffic Modeling Technical Report*, respectively. Disk 1 (CD) with the these Appendices contain just the opposite documentation.

Recommendation: Recommend the text be corrected here and in Chapter 3 (p. 3-4, last line of 2nd paragraph) and Chapter 5 (p. 5-183, last line on page) to refer the reader to the correct Appendices for the *Traffic Modeling Technical Report* (Appendix A) and the *Business Needs Survey* (Appendix B).

Problem: (p.xxiii, Disk 2, Appendix Y). Appendix Y Bald Eagle Permits. There is no Appendix Y on Disk 2).

Recommendation: Recommend Appendix Y be listed as “NOT USED” or identified as CONFIDENTIAL information.

Summary

Problem: (p.S-43, Table S.8-2 – Comparison of Tier 1 Costs and Impacts to Tier 2 Preferred Alternative). Alternative 2 incorrectly identifies 4F-2 instead of 4F-3 as part of the preferred alternative.

Recommendation: Recommend this table be corrected to show that 4F-3 instead of 4F-2 is considered part of the Preferred Alternative.

5.23.8 Class V Injection Well Permit (p.5-637)

Problem: The potential for an EPA Class V permit is not mentioned with the other permits in the DEIS SUMMARY Chapter.

Recommendation: The Class V Injection Well Permit be mentioned as a possible permit and its applicable requirements that may need to be complied in the Summary Chapter of the EIS.

Chapter 3 – Alternatives

Problem: (p.3-17). The listing of “key resources” such as Historic Properties, Wetlands, Cemeteries, Caves and Major Springs, Forests . . . are not represented on this page in a consistent and meaningful manner. For example: Cemeteries, Caves and Major Springs are depicted as subcategories under “Historic Properties.” Wetlands are part of the Historic Properties paragraph. This appears to be a document formatting problem.

Recommendation: Recommend this area of the FEIS be correctly formatted.

Chapter 4 – Affected Environment

Section 4.3.1.7 Karst and Springs

Problem/Solution: (p.4-80, Paragraph 2, line 3: This text should more accurately read “....which may remove ~~or kill~~ some organic contaminants or kill some biological contaminants.”

Problem/Solution: (p. 4-80, Paragraph 2, lines 4 through 5): Delete the sentence that states “Careful project planning will help minimize the effects of I-69 upon groundwater quality within the karst system.” This is not appropriate for the affected environment discussion; such conclusions should be limited to the environmental consequences chapter.

Problem/Solution: (p. 4-81, Paragraph titled “Taylor Ridge to SR 54”, line 4). The word “swallet” and other karst features should be added to the EIS glossary.

Problem: (p.4-4, Figure 4.1-1 – Study Area). This figure shows the wrong extent of Monroe County.

Recommendation: Recommend Figure 4.1-1 correctly depict the extent of Monroe and Lawrence Counties.

Problem: (p.4-117, Figure 4.3-5, page 3 of 6, Wetlands). See Problem immediately identified above.

Chapter 5- Environmental Consequences

Problem: (p.5-7, 4th paragraph, 7th line). What is the page or pages that should be identified here: “(See 5.6.3.1, *Traffic Conditions*, p. _)”?

Recommendation: Recommend this reference in the FEIS include the appropriate page or page numbers.

Problem: (p.5-179, FIGURE 5.5-1 – Section 4 Study Area). This figure shows the wrong extent of Monroe County.

Recommendation: Recommend Figure 5.5-1 correctly depict and label the extent of Monroe and Lawrence Counties.

Problem: (p.5-183, 5.6.2.1 General, last line). The reader is directed to Appendix B for a copy of the *Traffic Modeling Technical Report*. Appendix B contains the *Business Needs Survey*.

Recommendation: Recommend the reference for the *Traffic Modeling Technical Report* here be changed to Appendix A in the FEIS

Problem: (p.5-234, Section 5.9-Air Quality, MSATs, first full paragraph). Traffic projection numbers here are for Tier 2 Section 3 (between US 50 and US 231), not Section 4 (between US 231 and SR 37).

Recommendation: The EIS provide the correct traffic numbers for Section 4.

Problem: (p.5-236, last paragraph). The text refers the reader to Table 5.9-2 for summarized results of the CO hot spot-analysis. Table 5.9-2 (p.5-242) only presents information regarding Modeled Vehicle Miles Traveled. It is Table 5.9-1 (p5-238) that has the CO information.

Recommendation: The EIS provide the correct referral for CO information.

Problem/Solution: (p.5-241, first word). Change “tow” to “two”.

Problem/Solution: (p.5-241, first full paragraph, second to last line). Change “rick” to “risk”, and “form” to “for”.

Problem: Table 5.21-2 (pp. 5-586 through 5-587). In Table 5.21-2, caves are designated as 0-100', 100'-1000', 1000'-5000', or >5000'. What are these designations? Are they based on known dye tracing distances? Are they based on distances from the Alternatives evaluated?

Recommendation: Please explain these designations. Please provide a footnote similar to the note included for flow rates at the bottom of this table that explains the significance of these designations.

Problem: (p.5-652, 2nd line). The reader is referred to “see pages ### and ###.”

Recommendation: Provide the page numbers that the reader should be referred to.

Problem: (p.5-657, Lower White River Watershed, line 6). The reader is referred here to Table 5.19-6 for information regarding major streams and tributaries within the r-o-w. However, Table 5.19-6 Summary of Potential Stream and Riparian Corridor Impacts (p.5-459) does not provide this information. Did you mean Table 5.19-7 (pages 5-461 – 5-471)?

Recommendation: We recommend the EIS refer the reader to the correct intended Table.

Problem: (p.6-663, 7. Define a baseline condition for the resources, ecosystems and human communities, Wetlands, line 3). The reader is referred to Table 5.19-3 to find information that “illustrates the general quality of each wetland or wetland complex and provides a comparison of wetlands affected by each proposed alternative.” Table 5.19-3 does not provide the intended information. Do you mean Table 5.19-4, pp. 5-437 to 5-441?

Recommendation: We recommend the FEIS identify the correct intended Table to refer the reader to.

APPENDIX CC – ANALYSIS OF INDIRECT IMPACTS

Problem: (pp. 4 and 7). Text here refers the reader to Appendix A for the map that shows the TAZs used for this analysis. However, Appendix A is not included in the DEIS documentation.

Recommendation: Recommend Appendix A of the DEIS Appendix CC be included in the FEIS documentation.

Problem: (pp. 5 and 6). The text here claims that a table on page 6 shows the rank of TAZs by percentages of land cover which is ag or other open land; however, there is no formal table on page 6.

Recommendation: Recommend the reference to a table be deleted here or take the percentage information on page 6 and put it into table format.